PEER REVIEW HISTORY

ARTICLE DETAILS

TITLE (PROVISIONAL)	The current and possible future role of 3D modelling within oesophagogastric surgery: a scoping review protocol
AUTHORS	Robb, Henry; Scrimgeour, Gemma; Boshier, Piers; Balyasnikova, Svetlana; Brown, Gina; Bello, Fernando; KONTOVOUNISIOS, CHRISTOS

VERSION 1 – REVIEW

REVIEWER	Stergios, Konstantinos National and Kapodistrian University of Athens
REVIEW RETURNED	23-Dec-2020

GENERAL COMMENTS	An overall good study, a good idea, scientifically important, well planned. Possible future implications in practice look interesting and could be important. Very happy to review your job. Good luck!

REVIEWER	Schizas, Dimitrios National and Kapodistrian University of Athens, First Department of Surgery
REVIEW RETURNED	30-Apr-2021

GENERAL COMMENTS	Congratulations, this is a very interesting study protocol.

REVIEWER	Rybicki, FJ University of Cincinnati College of Medicine, Radiology
REVIEW RETURNED	04-Jul-2021

GENERAL COMMENTS	Is the research question or study objective clearly defined? The authors have not defined modeling. It seems to include digital surgical plan, anatomic models that are 3D printed, AR, and VR. Is the abstract accurate, balanced and complete? It is unclear if the authors have a clear understanding of how 3D visualization and 3D printing impact care for this limited disease set. It is also untrue that these collective technologies are "late adopters". There have been cases on display for these disease sets at the Radiological Society of North America Special Interest Group on 3D printing since the organization was created over 5 years ago. Is the study design appropriate to answer the research question?

	There is no evidence that this search will capture anything regarding the future role. If the project is revised, it could include only retrospective analyses. Are the outcomes clearly defined? The outcomes do not define modeling, and there will be different outcomes based on how the search was organized. Are the references up-to-date and appropriate? The references are not current and in many cases do not provide objective evidence to support the authors' claim. There are too many instances of this to list. General comments: My feelings are that comprehensive reviews and analyses in anatomic modeling, surgical guides, digital surgical planning, and AR/VR can only be conducted by authors who have broad-based experience each of these techniques for a set of use cases. The intersection of the methods and the diseases provides many use cases that could be discussed in the abstract, but none are included. Granted, I have not searched each author, but I am familiar with the work of the senior author who has contributed to the literature for lower GI tract disease. Nonetheless, the abstract does not include those details regarding the use cases to build confidence. That confidence is also lowered by the citations that do not capture the intended outcomes.

VERSION 1 – AUTHOR RESPONSE

Reviewer 1:
Dr. Konstantinos Stergios, National and Kapodistrian University of Athens

Author Reply
We would like to thank you for reviewing the manuscript and for your kind words.

Reviewer 2:
Dr. Dimitrios Schizas, National and Kapodistrian University of Athens

Author Reply
We would like to extend our gratitude for reading the manuscript and thanks for your kind sentiments.

Reviewer 3:
Dr. FJ Rybicki, University of Cincinnati College of Medicine

Author Reply
Firstly, we would like to thank you for taking the time to read the manuscript and provide extensive insights. From your helpful comments, the manuscript has been edited and resubmitted. Please see below, where a reply has been written for each comment submitted and we hope these allays your concerns.

“Is the research question or study objective clearly defined?
The authors have not defined modelling. It seems to include digital surgical plan, anatomic models that are 3D printed, AR, and VR.”

Reply:
The manuscript has been edited to provide a definition of 3D reconstruction. We describe 3D Reconstruction as the generation of either virtual or physical 3D anatomical models from 2D images. These 3D reconstructions, or 3D models, can be used in various settings including operative planning, surgical training, and patient engagement. For the purposes of the scoping review, we include specific applications of 3D reconstructions, such as 3D printed models, Augmented Reality and Virtual Reality, within 3D reconstruction.

“Is the abstract accurate, balanced and complete?
It is unclear if the authors have a clear understanding of how 3D visualization and 3D printing impact care for this limited disease set. It is also untrue that these collective technologies are "late adopters". There have been cases on display for these disease sets at the Radiological Society of North America Special Interest Group on 3D printing since the organization was created over 5 years ago.”

Reply:
Since the submission of this manuscript, the protocol title has been adjusted and changed from upper gastrointestinal surgery to oesophagogastric surgery to provide greater clarity on the group of diseases and conditions studied in the intended scoping review.
We apologise for any confusion around the term “late adopters”. Our intention was to express that oesophagogastric surgery specifically, in comparison to other surgical subspecialties like orthopaedics or maxillofacial surgery, has been relatively late into exploring the uses and applications of 3D reconstruction within the specialty.

Is the study design appropriate to answer the research question?
There is no evidence that this search will capture anything regarding the future role. If the project is revised, it could include only retrospective analyses.

Reply:
Again, we apologise for any inadvertent confusion around the term “future role”. Part of the intended aims of the scoping review was to outline current gaps in oesophagogastric 3D reconstruction research, in comparison to other surgical subspecialties. If any gaps were identified, we hoped to make recommendations for future research using work done in other surgical fields as a template. Therefore, these recommendations would be possible future roles of 3D modelling in oesophagogastric surgery.

Since the submission of the protocol to BMJOpen in October 2020, the Scoping Review report has been finalised and submitted for publication. As the research team believe it is important for the title of the scoping review protocol and the scoping review to be concordant, we are unable to change the title. However, we have clarified what is meant by ‘future role’ in the ‘Introduction’ (abstract and main body) and ‘Identify Research Question’ texts.
Are the references up-to-date and appropriate?
The references are not current and, in many cases, do not provide objective evidence to support the authors' claim. There are too many instances of this to list.

Reply:

Each reference has been reviewed and updated where applicable and possible. Similarly, each statement and matching references has been reviewed to ensure agreement.

General comments:
My feelings are that comprehensive reviews and analyses in anatomic modelling, surgical guides, digital surgical planning, and AR/VR can only be conducted by authors who have broad-based experience each of these techniques for a set of use cases.

The intersection of the methods and the diseases provides many use cases that could be discussed in the abstract, but none are included. Granted, I have not searched each author, but I am familiar with the work of the senior author who has contributed to the literature for lower GI tract disease. Nonetheless, the abstract does not include those details regarding the use cases to build confidence. That confidence is also lowered by the citations that do not capture the intended outcomes.

Reply:
We agree that the breadth of the intended scoping review is challenging and requires an experienced team to successfully analyse the literature. Therefore, prior to conducting this review and the generation of this protocol, we believe we have assembled a research team with the breadth of experience and understanding required to undertake such a challenge. Below is a short summary of the team and their expert contributions to the project, which hopefully will help build confidence in the overall project:
Mr Kontovounisios is a Colorectal Consultant and Senior Clinical Lecturer at Imperial College, with a wealth of experience in the research and application of 3D reconstruction techniques. Whilst his focus is colorectal, his expertise and understanding of the techniques greatly contributes to the team.
Mr Piers Boshier is a Clinical Lecturer at Imperial College and specialist trainee in Oesophagogastric Surgery and is experienced in the uses and applications of 3D reconstructive techniques. His specialist knowledge of oesophagogastric surgery has been essential to the project.
Professor Gina Brown is a Consultant Radiologist and Professor of Gastrointestinal Imaging. Professor Brown, along with her radiology colleague Dr Balyasnikova, kindly offered their significant experience in anatomical modelling and gastrointestinal imaging to the project.
Professor Bello is Professor of Surgical Computing and Simulation Science at Imperial College. His interests include the use of virtual and mixed reality environments in the context of training, education and patient engagement. He is uniquely positioned to have insights into both simulation (including AR/VR) as well as surgical practice, which makes him an indispensable component of the research team.
The vastly experienced senior component of the research team supported junior members, Mr Robb (an Academic Clinical Fellow in General Surgery at Imperial College) and Ms Scrimgeour (a surgical trainee at Imperial College Healthcare Trust) throughout the generation of the protocol and the project overall.